From investigations of the plant and its ecosystem to selection of biological control agents: specific case of the invasive alien bramble *Rubus alceifolius* in La Réunion Island

T. LE BOURGEOIS[A,B], S. BARET[C], G. LEBRETON[B], R. DESMIER DE CHENON[D]

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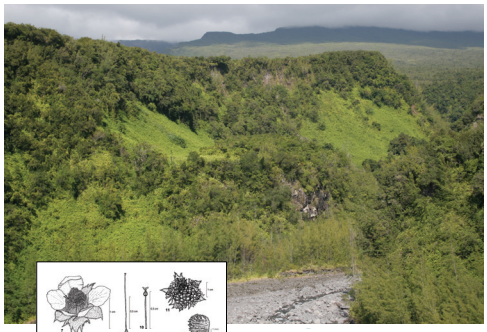
Giant bramble (*Rubus alceifolius* Poir., Rosaceae) is considered as one of the most exotic invasive plant of La Réunion Island. It colonises all open natural or cultivated ecosystems. A ten year research programme was carried out with the aim of biological control of the weed (1997-2007).

Stakes for La Réunion Island

► It invades forest gaps, secondary forests, field crop borders, tracks, road and river sides, etc. from sea level up to 1700 m of elevation.
► To date, mechanical and/or chemical control, are not sustainable because of small surface areas concerned, ecotoxicological impact and financial cost (2 million € per year).



Invasion by *R. alceifolius*
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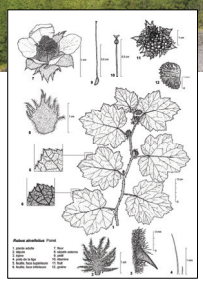

Botanical plate of *R. alceifolius*
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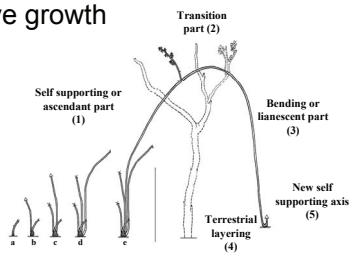
Growth strategy

► *R. alceifolius* is mid of a bush and a liana.
► Flowering and fruiting from 0 up to 1100 m.
► Only vegetative growth above 1100 m.



Different phases of *R. alceifolius* growth
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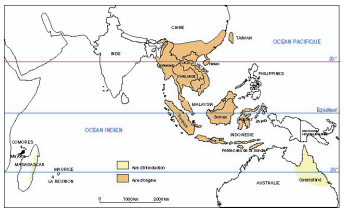
Multiplication and spread

► Multiplication occurs by seeds, layerings and cuttings.
► Spread is due to birds and human activities.

World distribution of the weed



World distribution map of the giant bramble
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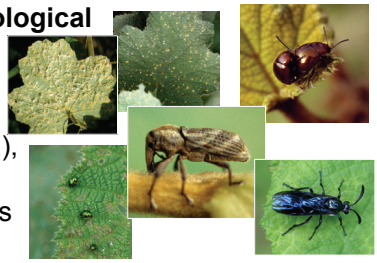
► Native to South-east Asia (China, Vietnam, Laos, Thailand, Indonesia)
► Introduced in La Réunion, Madagascar, Comores, Mauritius and Australia (Queensland).

Surveys for potential biological control agents

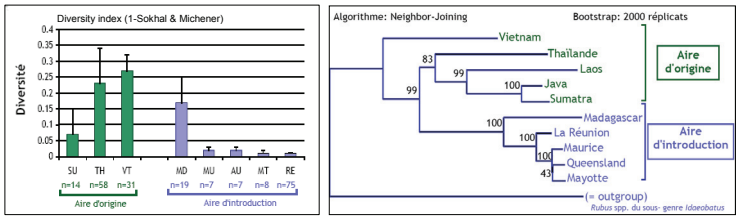


Hamaspora acutissima, Gerwasia rubi, Phaedon fulvescens, Cleorina modiglianii, Alcidodes sp., *Cibdela janthina*, © T. Le bourgeois, Cirad

► Surveys in Vietnam, Laos Thailand, Indonesia (Sumatra), China and La Réunion.
► 3 pathogens and 46 insects collected.
► 2 rusts, 2 beetles, 1 weevil and 1 sawfly studied.

Genetic analysis

►ALFP studies showed that *R. alceifolius* is clonal in La Réunion, Mauritius, Queensland, Mayotte, poorly variable in Madagascar and divers in the native range (Indonesia-Sumatra, Vietnam, Thailand).
►Populations in the area of introduction are genetically different to those of the native range.
►In the area of introduction it reproduces by apomyctic seeds.



Genetic diversity of native and introduced populations,
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The most promising biological control agent

Adult of *C. janthina*
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► Selection of *Cibdela janthina* (Hymenoptera: Argidae) highly specific, and showing good ecological and biological traits (climate matching, high fecondity, gregarious larvae, huge defoliation, multivoltine).
► Introduction and release in La Réunion in 01/2008. To date, under evaluation.

Gregarious larvae of *C. janthina*
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A-Cirad, UMR AMAP, B-Cirad UMR PVBMT, C-Parc National de la Réunion, D-PPKS Indonesia
thomas.le_bourgeois@cirad.fr

Centre de coopération internationale en recherche agronomique pour le développement